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Job No.: CTCE/BBMP/W.No.11/KRIDL/CEMENT/2014-15 Date: 03.11.2014

TEST REPORT

CLIENT	:	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
AGENCY	:	**Technical Manager,** KRIDL, Bangalore.
NAME OF THE WORK	:	Improvements to Roads, Construction of Culverts and Asphalting to Singapura Paradise Main Road and Cross Roads in Ward No.11(Kuvempunagara), Vidyaranyapura Sub Division, BBMP, Bangalore.
REFERENCE	:	EE/BTP/BBMP/KRIDL/WO/45/2014-15 Dated: 18.07.2014
SAMPLE ID	:	CEMENT
SAMPLES SUPPLIED BY	:	AGENCY

The results of the tests conducted on the cement sample are as follows:

Sl.No	Descriptions	Test Method as per IS	Test Result	Requirements as per IS: 1989-2013
1	Standard Consistency	IS-4031 (Part -4)	28.00 %	-
2	a) Initial Setting Time	IS-4031 (Part -5)	165 Minutes	Not Less than 30 Minutes
	b) Final Setting Time	IS-4031 (Part -5)	490 Minutes	Not More than 600 Minutes
3	Soundness by the Le-Chatelier method	IS-4031 (Part 3)	1 mm	Not more than 10 mm

Note:

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Job No.: CTCE/BBMP/W.No.11/KRIDL/SAND/2014-15 : 03.11.2014

TEST REPORT ON FINE AGGREGATES
IS 383-1970 (RA- 2002)

Client : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Technical Manager,** KRIDL, Bangalore.

Name of Work : Improvements to Roads, Construction of Culverts and Asphalting to Singapura Paradise Main Road and Cross Roads in Ward No.11(Kuvempunagara), Vidyaranyapura Sub Division, BBMP, Bangalore.

Reference : EE/BTP/BBMP/KRIDL/WO/45/2014-15 Dated: 18.07.2014

Date of Testing : 03.11.2014

Material : Sand Total Wt. of Aggregates in gms **1000**

Is Sieve Size in mm	Weight Retained (gm)	Retained Weight in %	Cumulative Retained Weight in %	Cumulative Weight Passing in %	Spec.Limits For Zone-II
10	0	0	0	100	100
4.75	60	6.00	6.00	94.0	90-100
2.36	150	15.00	21.00	79.0	75-100
1.18	189	18.90	39.90	60.1	55-90
600 Micron	210	21.00	60.90	39.1	35-59
300 Micron	265	26.50	87.40	12.6	8-30
150 Micron	82	8.20	95.60	4.4	0-10

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Job No.: CTCE/BBMP/W.No.11/KRIDL/WMM/Gradation/2014-15

23.10.2014

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Technical Manager,** KRIDL, Bangalore.

Name of Work : Improvements to Roads, Construction of Culverts and Asphalting to Singapura Paradise Main Road and Cross Roads in Ward No.11(Kuvempunagara), Vidyaranyapura Sub Division, BBMP, Bangalore.

Reference : EE/BTP/BBMP/KRIDL/WO/45/2014-15 Dated: 18.07.2014

Date of Testing : 23.10.2014

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **25095**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	710	710	2.8	97.2	95-100
22.4	5250	5960	23.7	76.3	60-80
11.2	5190	11150	44.4	55.6	40-60
4.75	4250	15400	61.4	38.6	25-40
2.36	4195	19595	78.1	21.9	15-30
0.600	2605	22200	88.5	11.5	8-22
0.075	2510	24710	98.5	1.5	0-8

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Job No.: CTCE/BBMP/W.No.11/KRIDL/WMM/Gradation/2014-15

25.10.2014

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Technical Manager,** KRIDL, Bangalore.

Name of Work : Improvements to Roads, Construction of Culverts and Asphalting to Singapura Paradise Main Road and Cross Roads in Ward No.11(Kuvempunagara), Vidyaranyapura Sub Division, BBMP, Bangalore.

Reference : EE/BTP/BBMP/KRIDL/WO/45/2014-15 Dated: 18.07.2014

Date of Testing : 25.10.2014

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **25025**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	685	685	2.7	97.3	95-100
22.4	5150	5835	23.3	76.7	60-80
11.2	5290	11125	44.5	55.5	40-60
4.75	4150	15275	61.0	39.0	25-40
2.36	4210	19485	77.9	22.1	15-30
0.600	2590	22075	88.2	11.8	8-22
0.075	2650	24725	98.8	1.2	0-8

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26.10.2014

GRADATION FOR WMM
MORTH TABLE-400-11

Client : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Technical Manager,** KRIDL, Bangalore.

Name of Work : Improvements to Roads, Construction of Culverts and Asphalting to Singapura Paradise Main Road and Cross Roads in Ward No.11(Kuvempunagara), Vidyaranyapura Sub Division, BBMP, Bangalore.

Reference : EE/BTP/BBMP/KRIDL/WO/45/2014-15 Dated: 18.07.2014

Date of Testing : 26.10.2014

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **24965**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	620	620	2.5	97.5	95-100
22.4	5210	5830	23.4	76.6	60-80
11.2	5305	11135	44.6	55.4	40-60
4.75	4090	15225	61.0	39.0	25-40
2.36	4310	19535	78.2	21.8	15-30
0.600	2515	22050	88.3	11.7	8-22
0.075	2515	24565	98.4	1.6	0-8

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Job No.: CTCE/BBMP/W.No.11/KRIDL/WMM/AIV/2014-15 23.10.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements to Roads, Construction of Culverts and Asphalting to Singapura Paradise Main Road and Cross Roads in Ward No.11(Kuvempunagara), Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/KRIDL/WO/45/2014-15 Dated: 18.07.2014
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	23.10.2014

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	390	391	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	82	83	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	308	308	
4	Aggregate Impact value = percent fines	21.03	21.23	
	100* (W_2/W_1)%			**21.13**

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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Job No.: CTCE/BBMP/W.No.11/KRIDL/WMM/S-T/2014-15 23.10.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager**, KRIDL, Bangalore.
Name of Work	Improvements to Roads, Construction of Culverts and Asphalting to Singapura Paradise Main Road and Cross Roads in Ward No.11(Kuvempunagara), Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/KRIDL/WO/45/2014-15 Dated: 18.07.2014
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	23.10.2014

Civil-Tech Consultants & Engineers Bangalore

Result : Flakiness Index = **12.35%**

Elongation Index = **13.90%**

Result : Combined Flakiness & Elongation index **26.25%**

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

Note:

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Job No.: CTCE/BBMP/W.No.11/KRIDL/SDBC/AIV/2014-15 05.11.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements to Roads, Construction of Culverts and Asphalting to Singapura Paradise Main Road and Cross Roads in Ward No.11(Kuvempunagara), Vidyaranyapura Sub Division, BBMP,
Reference	EE/BTP/BBMP/KRIDL/WO/45/2014-15 Dated: 18.07.2014
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
28.07.2014	05.11.2014

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	388	389	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	85	86	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	303	303	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	21.91	22.11	**22.01**

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Job No.: CTCE/BBMP/W.No.11/KRIDL/SDBC/Shape_T/2014-15 : 05.11.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	: **Technical Manager,** KRIDL, Bangalore.
Name of Work	: Improvements to Roads, Construction of Culverts and Asphalting to Singapura Paradise Main Road and Cross Roads in Ward No.11(Kuvempunagara), Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	: EE/BTP/BBMP/KRIDL/WO/45/2014-15 Dated: 18.07.2014
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 05.11.2014

Result : Flakiness Index = **11.50%**

Elongation Index = **13.60%**

Result : Combined Flakiness & Elongation index **25.10%**

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.11/KRIDL/SDBC/Stripping/2014-15 05.11.2014

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the work	Improvements to Roads, Construction of Culverts and Asphalting to Singapura Paradise Main Road and Cross Roads in Ward No.11(Kuvempunagara), Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/KRIDL/WO/45/2014-15 Dated: 18.07.2014
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	05.11.2014

Type of binder : 80/100
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.1	3.20	96.80
2	3.2		
3	3.3		

Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/W.No.11/KRIDL/SDBC/Sp_Wa/2014-15 05.11.2014

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Technical Manager,** KRIDL, Bangalore.
Name of the Work	Improvements to Roads, Construction of Culverts and Asphalting to Singapura Paradise Main Road and Cross Roads in Ward No.11(Kuvempunagara), Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/KRIDL/WO/45/2014-15 Dated: 18.07.2014
Type of Mix	Semi Dense Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	05.11.2014

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2028	2025	2024	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1273	1270	1269	
4	Weight of saturated surface dry aggregate in air	W_3 g	2019	2022	2025	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	746	752	756	
6	Weight of oven dried aggregate	W_4 g	2010	2015	2003	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.694	2.680	2.649	2.674
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.727	2.705	2.729	2.720
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.45%	0.35%	1.10%	0.63%

Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%

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M/s. Civil-Tech Consultants & Engineers

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CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

An ISO 9001:2008 Certified Company

NABL - Accredited Laboratory as per ISO / IEC-17025 : 2005

JAS-ANZ BSCIC ISO 9001 REGISTERED

Job No.: CTCE/BBMP/W.No.11/KRIDL/SDBC/Bitumen/2014-15 05.11.2014

BITUMEN CONTENT AND GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

As per IS2386 and IRC:SP:11-1984

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
AGENCY	**Technical Manager,** KRIDL, Bangalore.
NAME OF THE WORK	Improvements to Roads, Construction of Culverts and Asphalting to Singapura Paradise Main Road and Cross Roads in Ward No.11(Kuvempunagara), Vidyaranyapura Sub Division, BBMP, Bangalore.
REFERENCE	EE/BTP/BBMP/KRIDL/WO/45/2014-15 Dated: 18.07.2014
SAMPLE I/D	Singapura Paradise Main Road and Cross Roads in Ward No.11, BBMP, Bangalore.
DATE OF TESTING	05.11.2014

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	475	474
3. Weight of Asphalt and Mineral matter Extracted,	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	25	26.00
7. Bitumen content in %	5.00	5.20
8. Average	**5.10**	

GRADATION AFTER EXTRACTION

SIEVE SIZE	Trail 1				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	33.25	7.00	7.00	93.00	90-100
4.75	242.5	51.05	58.05	41.95	35-51
2.36	38.52	8.11	66.16	33.84	24-39
1.18	41.25	8.68	74.85	25.15	15-30
0.3	43.26	9.11	83.95	16.05	9-19
0.075	56.32	11.86	95.81	4.19	3-8

SIEVE SIZE	Trail 2				JOBMIX
mm	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	Gradation
13.2	0	0	0	100	100
9.5	31.25	6.25	6.25	93.75	90-100
4.75	255.6	51.12	57.37	42.63	35-51
2.36	56.36	11.27	68.64	31.36	24-39
1.18	46.35	9.27	77.91	22.09	15-30
0.3	38.25	7.65	85.56	14.44	9-19
0.075	40.23	8.05	93.61	6.39	3-8

Note:

Þ This test report should not be reproduced except in full, without written approval of the laboratory.

Þ The results indicated above are based on the tests carried out on the samples received in the laboratory.

Þ Any Query regarding the report must be received within 30 days from the date of testing.

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ವಿದ್ಯಾರಣ್ಯಪುರ ಉಪ ವಿಭಾಗ
ಯಲಹಂಕ ಪಲಯ,